Remarks

Reconsideration of the subject application is requested in view of the foregoing amendments and the following remarks.

The Abstract is amended to reduce the word count, as requested in the Office action. With respect to word count, it is pointed out to the examiner that hyphenated words are, according to any contemporary authority on grammar, regarded as single words. For example, "reticle-contact" is a single word.

The drawings are objected to for allegedly failing to depict vacuum apertures situated equi-distantly and equi-angularly with respect to each other. In response, FIG. 4(A) and the paragraph beginning on page 11, line 11 have been amended. No new matter is submitted.

Claims 1-38 are pending. In this Amendment, no claims are amended.

The search performed by the examiner in the course of substantively examining the pending claims is appreciated.

The status of claims 8, 11, 13-18, 24, and 27-28 as being free of the cited art is acknowledged.

Claims 1-7, 9-10, 12, and 19-23 stand rejected for alleged obviousness from Van Der Meulen in view of Kim. This rejection is traversed.

Independent claim 1 is representative of the subject claims, and is directed to a reticle manipulator for handling a circular reticle having a peripheral handling zone. The reticle manipulator comprises a movable member and a reticle-support member. The reticle-support member has a trunk portion coupled to the movable member and a distal portion extending from the trunk portion. The trunk portion and distal portion define respective vacuum ports situated and configured to engage, with vacuum suction, three respective locations in the handling zone so as to hold the reticle to the reticle-support member without contacting the patterned area. Since the reticle manipulator is for handling a circular reticle having a peripheral handling zone, the reticle manipulator is especially suitable for handling a reticle as used in charged-particle-beam microlithography (e.g., electron-beam, or "EB," microlithography). As described in the specification (page 2, line 8 to page 3, line 2):

> In an electron-beam (EB) microlithography system (as an example of a CPB microlithography system), the thick, square, glass reticle conventionally

used for optical microlithography is not used. Instead, the EB-lithography reticle typically is round (*e.g.*, 200 to 300 mm in diameter) and much thinner (*e.g.*, 0.5 to 1.0 mm). These reticles are made from silicon wafers ("reticle substrates") having a standardized configuration (*e.g.*, a particular diameter, thickness, notched, or non-notched) according to standards established by Semiconductor Equipment and Materials International (SEMI). Almost the entire surface of the EB-lithography reticle is patterned. Since the entire pattern cannot be exposed in a single exposure "shot," the EB lithography reticle is divided into multiple "exposure units" (usually termed "subfields") each defining a respective portion of the pattern and being individually exposed. During exposure an electron beam is irradiated, from above, onto a selected subfield of the reticle.

Portions of the reticle that define pattern features and that actually are irradiated by the electron beam are membranous and hence very thin and delicate. Consequently, these portions of the reticle must not contact any other surfaces (such as a surface of a reticle manipulator). Rather, during reticle manipulation, the reticle must be handled and supported only by its non-patterned (and more robust) peripheral "handling zone." The handling zone of an EB-lithography reticle typically is narrow, with a maximum usable width of several mm.

Unfortunately, among conventional reticle "manipulators" (encompassing any of various devices, usually robotic, that perform handling and/or moving of the reticle), none are configured to accommodate a thin, circular, reticle or reticle substrate as used in EB microlithography or CPB microlithography in general.

These "conventional" reticle manipulators include manipulators as discussed in Van Der Meulen, wherein the substrate manipulator of Van Der Meulen would be incapable of handling a reticle as described above. A substrate is sufficiently strong and self-supporting that it can be held anywhere without fear of imparting physical damage to the substrate. In FIG. 1 of Van Der Meulen, it can readily be seen that the substrate 84 intended to be held by the manipulator (substrate transfer robot) 40 is not held in a peripheral handling zone. Rather, the "end effector" 82 holds the substrate 84 somewhat centrally, as shown in FIG. 1. Van Der Meulen is completely silent on: (1) substrates or reticles having peripheral handling zones, (2) any reasons for which a substrate or reticle would have a peripheral handling zone, (3) particular concerns associated with manipulating a reticle while contacting the reticle only in the peripheral handling zone, and (4) how to go about handling the reticle only in its peripheral handling zone. Furthermore, if one attempted to handle a reticle having a peripheral handling zone (wherein the reticle could be handled safely only by its peripheral handling zone) using the substrate transfer robot of Van Der Meulen, the reticle would be irreparably damaged for reasons as discussed

above in the quoted paragraphs from the specification. The incidence of such damage would be inherent and inevitable, and the various contentions set forth in paragraph 6 (page 4) of the Office action do not alter this inescapable result. Hence, the subject claims are not, and cannot be, obvious from Van Der Meulen.

Kim does not fulfill the deficiencies of Van Der Meulen. First, the device 50 of Kim appears to be substantially identical to the end effector 82 in Van Der Meulen. Second, the Kim device does not appear to be intended for handling reticles. Third, the size of the wafer W relative to the tines of the device of Kim is clearly shown, leading to the inevitable conclusion that the wafer W lacks a peripheral handling zone by which (and only by which) the wafer can be safely handled. Using the Kim device, if one attempted to support a reticle, having a peripheral handling zone by which (and only by which) the reticle can be safely handled, irreparable damage would occur to the reticle.

Therefore, the subject claims are not obvious from any conceivable combination of Van Der Meulen and Kim.

Claims 33-38 stand rejected for alleged obviousness from Van Der Meulen in view of Kim. This rejection is traversed for reasons substantially the same as discussed above. Neither Van Der Meulen nor Kim addresses the particular problems associated with manipulating a reticle having a peripheral handling zone. Kim appears to be silent on manipulating reticles of any kind. Simply picking up an object in the manner suggested by either of these references does not, without more, provide the skilled person with insight into how to solve the problem of picking up and transporting circular reticles having respective peripheral handling zones by which (and only by which) the reticles can be handled without causing irreparable damage to the reticle.

Therefore, claims 33-38 are not obvious from any conceivable combination of Van Der Meulen and Kim.

Claims 25-26 stand rejected for alleged obviousness from Van Der Meulen in view of Kim and Akimoto. This rejection is traversed.

Claims 25 and 26 depend from claim 21, which defines the reticle manipulator in terms that are similar to the recitation in claim 1. Hence, claims 25 and 26 are properly allowable over Van Der Meulen and Kim for all the reasons discussed above pertaining to claim 1. Akimoto,

cited for its alleged discussion of registering and aligning a wafer, does not fulfill the deficiencies of Van Der Meulen and Kim.

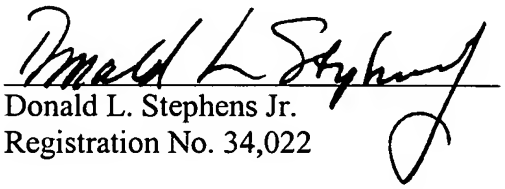
Therefore, claims 25 and 26 are not obvious from any conceivable combination of Van Der Meulen, Kim, and Akimoto.

All the pending claims are in condition for allowance, and early action to such end is requested.

The Applicants are entitled to an interview at this stage of prosecution. If any issues remain after consideration and entry of the instant reply, the examiner is requested to telephone the undersigned to schedule an interview. Any inaction by the examiner in this regard, followed by issuance of a final Office action, will be regarded as an acquiescence by the examiner to grant an interview as a matter of right after the final action.

Respectfully submitted,

KLARQUIST SPARKMAN, LLP

By 
Donald L. Stephens Jr.
Registration No. 34,022

One World Trade Center, Suite 1600
121 S.W. Salmon Street
Portland, Oregon 97204
Telephone: (503) 595-5300
Facsimile: (503) 228-9446

Amendments to the Drawings

Enclosed herewith is a revised sheet containing FIGS. 4(A)-4(C), in which FIG. 4(A) is amended as discussed herein. Also attached is a "markup" sheet highlighting the changes to FIG. 4(A).

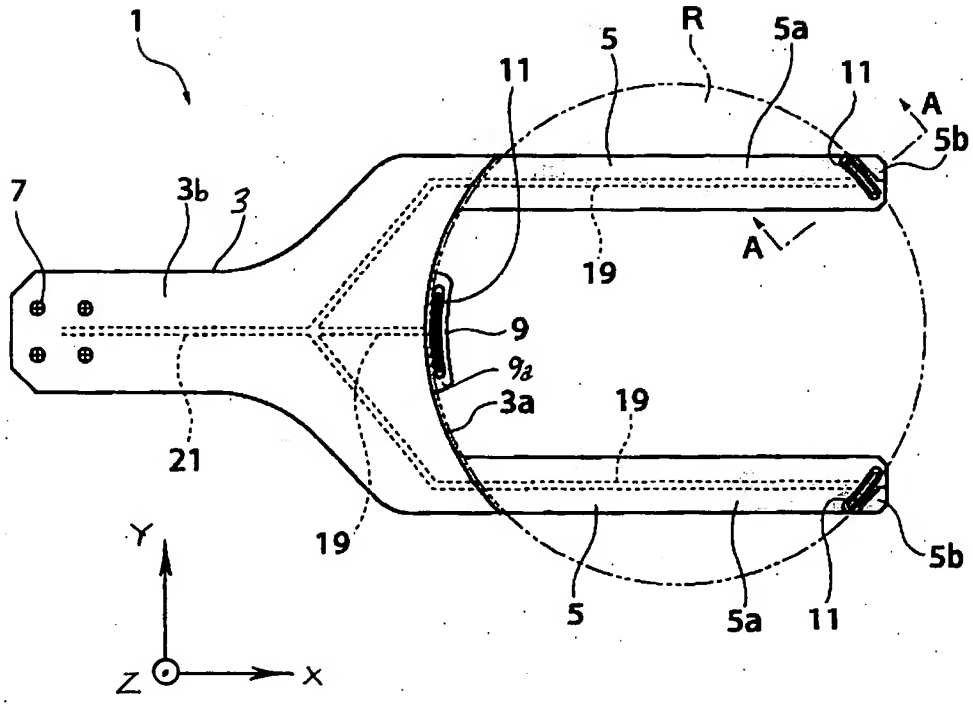


FIG. 4(A)

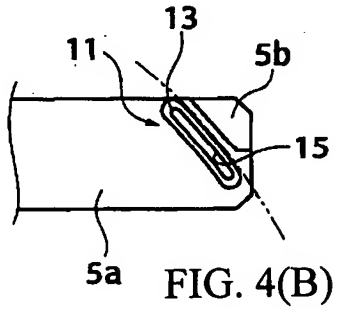


FIG. 4(B)

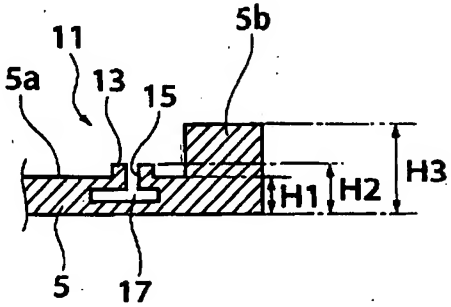


FIG. 4(C)

"MARKUP"